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The ISIS Pre-injector Reconfiguration

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The ISIS pre-injector consists of: a high current negative Penning ion source; a 35 KV post extraction acceleration gap; a 3 solenoid Low Energy Beam Transport (LEBT); a mechanical beam stop and beam diluter for machine setup and a 655KeV 4-rod 202.5 MHz Radio Frequency Quadrupole (RFQ).

The present pre-injector configuration has successfully delivered beam for ISIS operations for over 10 years since the RFQ replaced the old Cockcroft-Walton 665KV high voltage platform. At the time it was felt necessary to maintain the ability to revert to the old Cockcroft-Walton setup in order to keep the risk to ISIS operations as low as possible. In order to do this the entire new pre-injector installation had to be squeezed into the space previously occupied by the old Medium Energy Beam Transport (MEBT). Space was so limited that the RFQ had to be installed directly up against the first tank of the Drift Tube Linac (DTL). This results in significant beam loss due to mismatching of the beam parameters.

With the reliability of the RFQ more than proven and the desire to reinstate a MEBT, this paper details the reconfiguration work done to expand the area and prepare for the installation of a new MEBT. The civil, electrical and mechanical work undertaken are outlined and the new layout of ancillary equipment detailed. The new ancillary equipment installed is also stated. The motivation for building a new MEBT is discussed and a new design briefly mentioned.